HNR

MECHANICAL CALCULATION COVER SHEET

Calculation No:3442.053.MCAL.006,
Calculation Title: WALL HYDRANT SECTION
Project ID # 100256
Project Title: CCN CHILLED WATER SYSTEM OPTIMIZATION MASTER PLAN

ORIGINAL AND REVISED CALCULATION/ANALYSIS APPROVAL

	Rev._A Name/Signature/Date	**Rev. B Name/Signature/Date**	**Rev._0 Name/Signature/Date**
Originator: DAVID WALKER			09/04/02
Checked By: MIKE SLAMAN			09/04/02
Approved By: MIKE SLAMAN			09/04/02
Other:			

AFFECTED DOCUMENTS

Document Number	**Document Title**	**Rev. Number**
3442.053.MCAL. .006.	LDCC EC-1 MODIFICATIONS sheets M-0001 and M-7000	0

Record of Revision

Rev.	**Reason for Revision**
REV 0	ISSUED FOR CONSTRUCTION.

HNR Holmes & Narver | Raytheon

CALCULATION CHECKLIST

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Task/Project #: 100256
Task Order 053
CCN CHILLED WATER SYSTEM OPTIMIZATION MASTER PLAN

Calculation Number: 3442.053.MCAL.006 | Revision: 0

Reviewer/Checker : MIKE SLAMAN | Date: 7/31/02

Reviewer performed or supervised subject calculation.
_X_NO _____YES Justification Attachment _____, _____ pages

Alternate Verification method approved _____ Method _____

ITEM(S) CHECKED	Accept Y/N	OBJECTIVE EVIDENCE Sheets		INITIAL/ DATE 7/31/02
1. Cover forms properly completed.	Y			@
2. Calculation Sheet headers complete with calc. no., rev., etc.	Y			@
3. Calculation Sheet contents complete per format.	Y			@
4. Listed attachments included.	Y			@
5. Calculation Objective clearly described.	Y			@
6. Criteria are suitable and properly referenced to task-specific documents.	Y			@
7. Assumptions and data described and attached or referenced to task documents.	Y			@
8. Calculation method identified and appropriate for the design activity.	Y			@
9. Calculation results reasonable and correctly described in Results and Conclusions.	Y			@
10. Computer Program identified with version and revision.	N/A			
11. Computer Program references method used, etc.	N/A			
12. Computer input/output provided.	N/A			
13. Computer run traceable to calculation.	N/A			
14. Computer input data within permissible design input range.	N/A			
15. Computer Program validation/verification addressed.				

REMARKS

Mike Slaman — Date 7/31/02

Checker Print Name & Sign
MIKE SLAMAN

David F. Walker — Date 7/31/02

Preparer Print Name & Sign
DAVID WALKER

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MECHANICAL
DESIGN CALCULATION SHEET

Project Title: CCN CHILLED WATER SYSTEM OPTIMIZATION MASTER PLAN

Project ID #100256

Calculation No.
3442.053.MCAL.006

Rev. No. 0

Calculation Title: WALL HYDRANT SELECTION

PERFORMED BY: David T. Walker DATE 7/25/02
DAVID WALKER

CHECKED BY Mike Slaman DATE 7/31/02
MIKE SLAMAN

INTRODUCTION

Purpose

The "Statement of Work" provided from LANL dated 7/24/01 states " Provide feasibility and Title II services to connect the CCF chilled water plant to the LDCC plant such that CCF chillers will be shut down and removed and the LDCC plant will be supplying chilled water to the CCF and outlying buildings." This work requires several objectives. The first five objectives re defined in the scope listed below.

Scope

1. Verify that the LDCC chiller plant can adequately support the cooling loads of both LDCC and CCF plants.
2. Develop a plan to modify the LDCC equipment room cooling system from an evaporative based system to a chilled water based system.
3. Add a larger chilled water expansion tank to the combined chilled water systems.
4. Modify chilled water pump impellers to match the combined chilled water pumping loads. Add backdraft dampers to air handling unit EC-1 supply fans.
5. Evaluate the LDCC 900 Ton chiller condenser water pump and replace it if necessary.
6. Add wall hydrant at north end of LDCC to replace hose bibb eliminated by the removal of the make-up water to the evaporative cooling in EC-1. Maintenance needs this hose attachment to be able to clean the cooling tower 1837.

DESIGN BASIS

Design Inputs

1. Test and Balance data performed by the Kirk Air Co. on 7/17/01 for CCF and Ambient Air Balance Co. for LDCC on 02/02/90.
2. LDCC equipment room 189 cooling load calculations for LDCC Chiller Replacement Project I.D. 100015.
3. Results from the pipe model program "Pipe Flo" created by Engineered Software INC. See Calculaltion M003.
4. Manufacturers' equipment and installation requirements.

Criteria

Maintain LDCC equipment room at 70 to72^{0}F.

Limit plant shut downs- both LDCC and CCF plant

Assumptions

Future cooling loads identified under the "LDCC Chiller Replacement" project I.D. 100015 will not be realized.

Condensate piping that will be converted to chilled water piping can be properly cleaned and that the pressure drop through the piping will be minimal.

REFERENCES

Test and Balance data, and "LDCC Chiller Replacement" calculations referenced above. Also manufacturer data was used to match equipment parts to existing equipment.

METHODS

By using equipment name plate data listed in the Test and Balance report, chilled water system temperature and pressure readings, etc., the current cooling load was determined and compared with the chiller plant equipment capacities to determine if adequate. Pump data obtained from the T&B reports were used to determine pump impeller sizes necessary to meet the pump flow rates. Field measurements were used to determine chilled water coil installation requirements. Coil was sized using manufacturer computer software.

RESULTS AND CONCLUSIONS

LDCC chiller plant does have adequate capacity to serve both LDCC and CCF cooling loads. The evaporative media in air handler EC-1 can be replaced with a 4-row cooling coil and casing. The cooling coil will have to be knocked down and rebuilt inside the fan housing because it won't fit otherwise. Chilled water pump impellers can be increased in size by replacing the entire rotating elements of the pumps. The air handling unit EC-1 fans do not have anyway currently to keep air from reversing itself through the standby fans. Adding backdraft dampers to each of the four fans will not work because of space constraints in the air handling unit. Therefore the fan inlet cones will be replaced with new inlet cones that have built-in inlet vanes for damper control.

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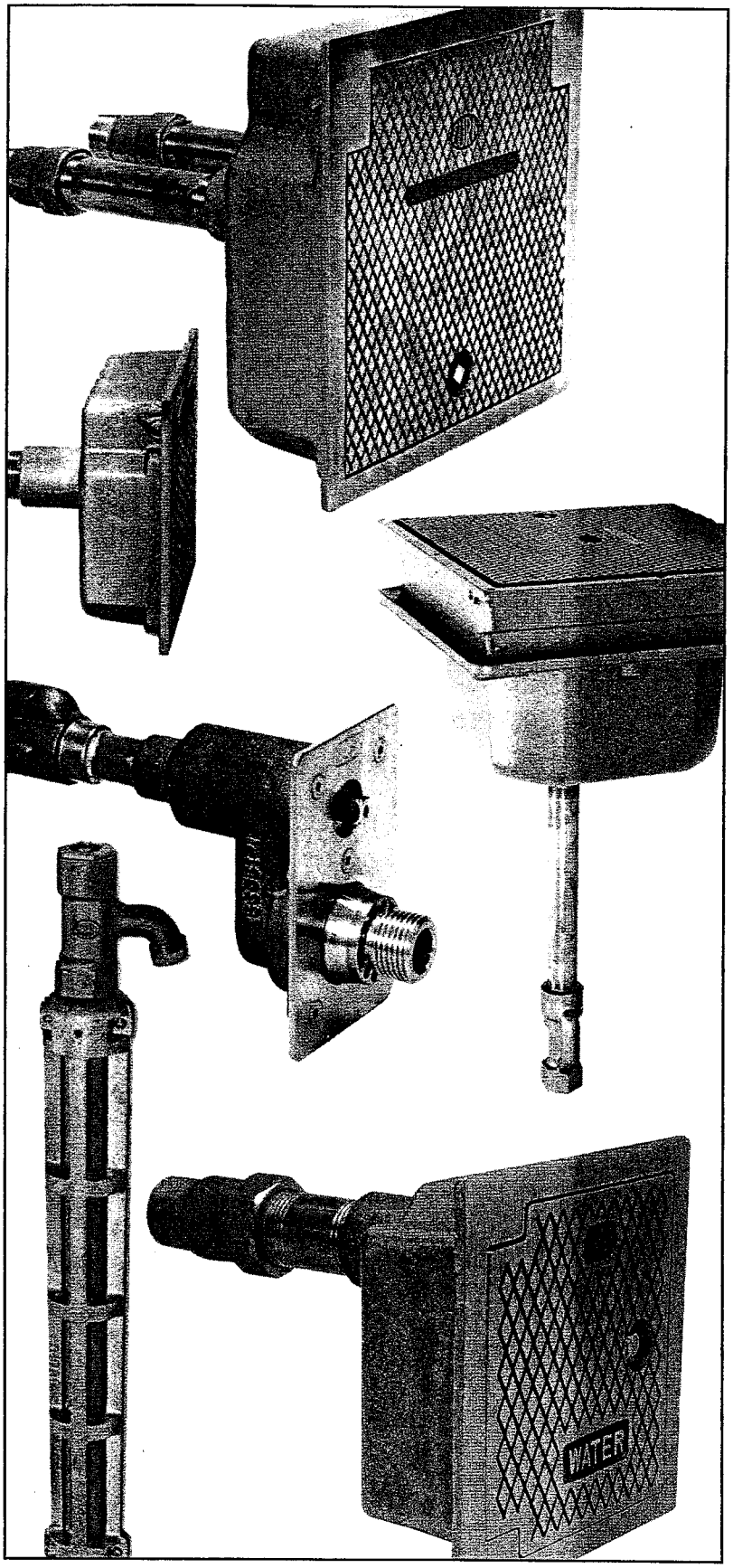

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APPLICATION INDEX

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NOTE: Any of the non-freeze/self-draining hydrants may be used in moderate climates.

OPTIONS and VARIATIONS

All Zurn hydrant options are specified as a suffix letter or number added to the series designation. Below are the available suffixes. For a pictorial view of some of the suffixes refer to the installation data in this section.

–HD Heavy-Duty Cover
–K Flashing Flange
–KC Flashing Flange w/Clamp Collar
–RK Hydrant Parts Repair Kit
–1 3/4" IP Straight Female Inlet Adapter
–3 3/4" Solder Female Inlet Adapter
–4 Wall Clamp
–5 3/4" Adapter Vacuum Breaker
–6 Polished Bronze Face
–7 Plain Bronze Face
–8 D.C.C.I. Box and Cover
–10 Polished Nickel Bronze Face
–11 Statuary Bronze Face (Specify light, medium or dark finish.)
–12 Cylinder Lock
–13 3/4" IP 90° Inlet Elbow w/Union Nut
–14 "Water" Cast on Cover
–15 Stainless Steel Box and Cover
–17 1/4" IP Drain Port in Box
–18 Wheel Handle
–20 Aluminum Casing Guard

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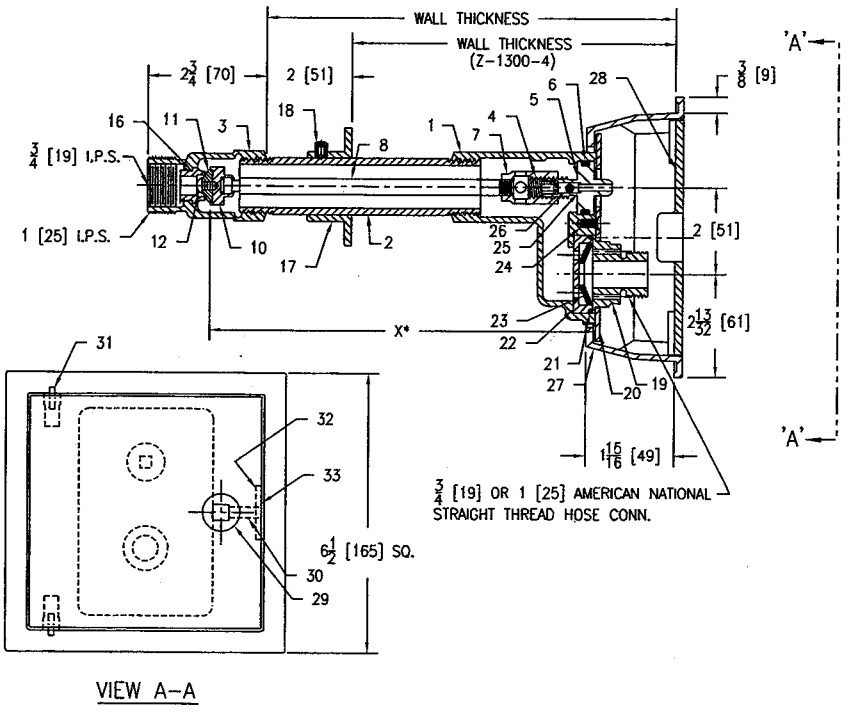
GENERAL PRODUCT INFORMATION

Zurn Industries, Specification Drainage Engineering, has done extensive testing and research to develop a complete line of hydrants to meet any job condition. Zurn offers both wall and ground hydrants for warm or cold climates. Pictured below are two of our most popular hydrants, Z-1300 and Z-1385. Use the following illustrations for general information and ordering replacement parts. For assistance consult your local Zurn Specification Drainage Sales Representative.

Z-1300 PARTS LIST

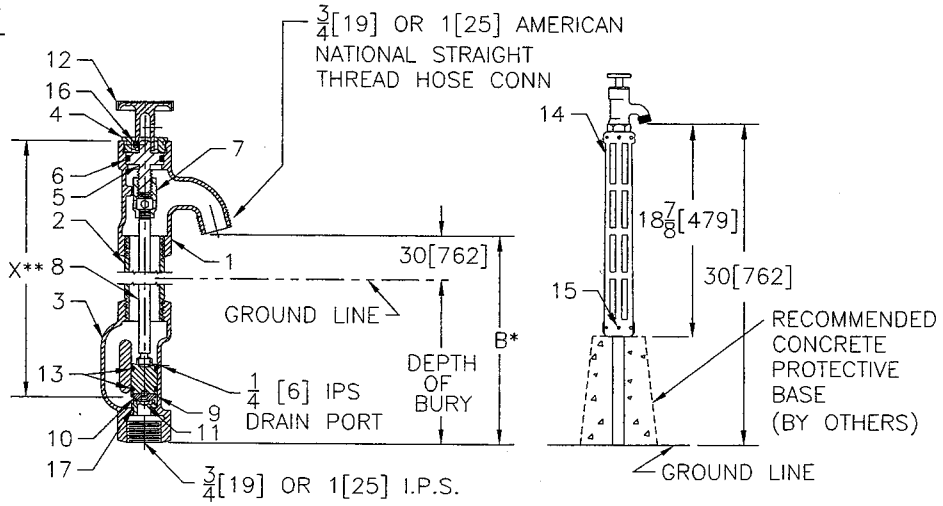
ITEM	NAME	QTY
1	Head	1
2	Casing	1
3	Valve Housing	1
4	Screw	1
5	Operating Screw	1
6	"O" Ring	1
7	Operating Coupling	1
8	Operating Rod	1
9	Union Nut	1
10	Washer Guide	1
11	Washer (Neoprene)	1
12	Screw 3/16-24 NC	1
13	Key (Not Shown)	1
14	Key Setscrew (When Spec.)	1
15	Union Ell	1
16	Removable Seat	1
17	Wall Locknut	1
18	Locknut Screw	1
19	Nozzle	1
20	Wall Plate	1
21	"O" Ring	1
22	Disc	1
23	"Equa-Balance" Seal	1
24	Screw	5
25	"O" Ring	1
26	Ball	1
27	Body	1
28	Cover	1
29	Lock Pin Mounting	1
30	Lock Pin	1
31	Hinge Pin	2
32	Lock Clip	1
33	Screw	2



VIEW A–A

Z-1385 PARTS LIST

ITEM	NAME	QTY
1	Head	1
2	Casing	1
3	Valve Housing	1
4	Face Nut	1
5	Operating Screw	1
6	"O" Ring	1
7	Operating Coupling	1
8	Operating Rod	1
9	Washer Guide	1
10	Washer (Neoprene)	1
11	Screw 3/16-24 NC	1
12	Key	1
13	"O" Ring	2
14	Casing Guard	1
15	Setscrew	2
16	Setscrew (When Spec.)	1
17	Removable Seat	1



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DEFINITIONS OF COMMON TERMS

ANTI-SIPHON
Feature in Ecolotrol hydrants that protects against back siphonage. It is recommended that hose be disconnected from hydrant after use.

BACKFLOW
All Ecolotrol hydrants are equipped with a backflow preventer. This device is designed to prevent the flow of water, or other liquids, into the potable water supply from any source other than those intended.

BACK-SIPHONAGE
A type of backflow caused by negative pressure in potable water supply piping. Both optional screw-on backflow preventers (vacuum breakers) and integral Ecolotrol hydrant vacuum breakers protect against back siphonage.

MODERATE CLIMATE HYDRANTS
Hydrant that is not self-draining, nor does it have a remote shut-off, which is typically located in a wall or underground. These hydrants should only be used in areas where there is no danger of freezing.

NON-FREEZE (FROST PROOF), AUTOMATIC DRAINING HYDRANTS
Hydrants for the purpose of supplying potable water to a hose connection without danger of freezing. Hydrant allows water remaining in exposed area to drain, thus reducing the possibility of freezing and damage to the hydrant.

VACUUM BREAKER
Type of backflow preventer used in hydrants to prevent contamination of potable water supply through back pressure or back siphonage.

VARI-TEMP
Mixing hydrant that allows connection to both hot and cold supplies; thus it is used to supply tempered water.

TECHNICAL INFORMATION (GENERAL)

FLOW RATES
Zurn 3/4" hose connection wall and ground hydrants allow a flow of approximately 10 GPM under average pressures. 1-1/4", 1-1/2", and 2" hose connection hydrants allow flow rates in excess of 100 GPM.

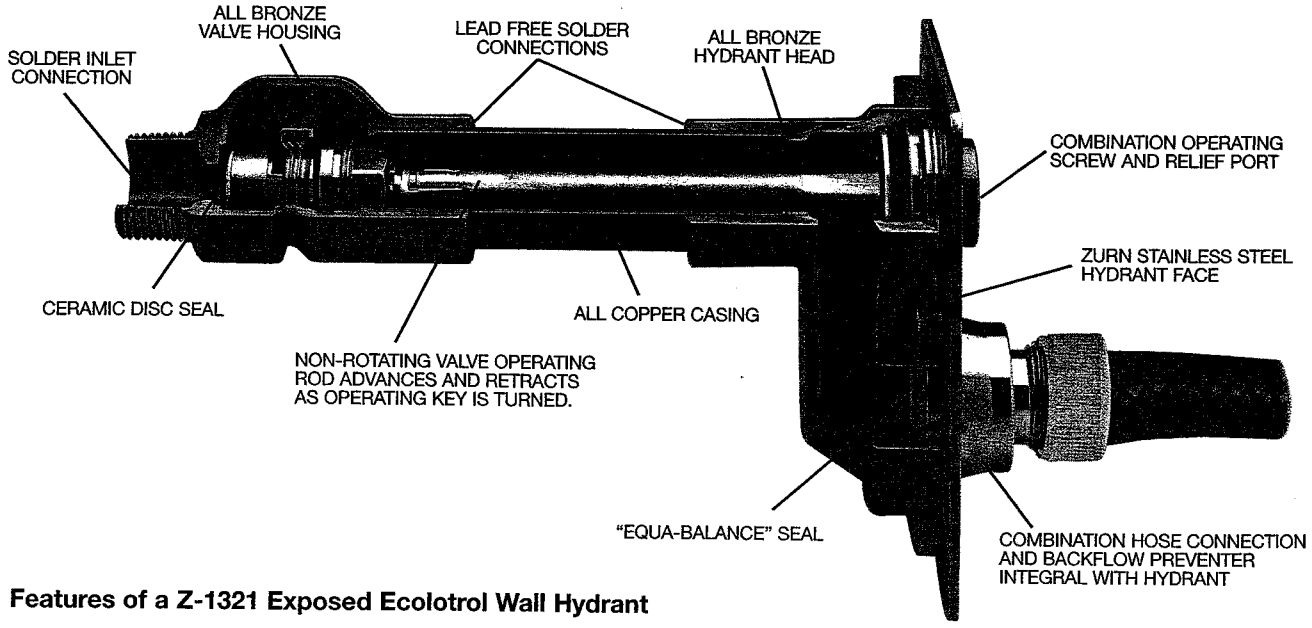
OPERATING PRESSURES
Maximum static pressure 125 PSI.
Minimum running pressure 8 PSI.

TEMPERATURE RANGE
Maximum 130° F.
Minimum 33° F.

PRODUCT COMPLIANCE

In general, Zurn hydrants are designed to comply with ANSI A112.21.3M. Zurn Ecolotrol hydrants are designed to comply with ANSI/ASSE 1019.

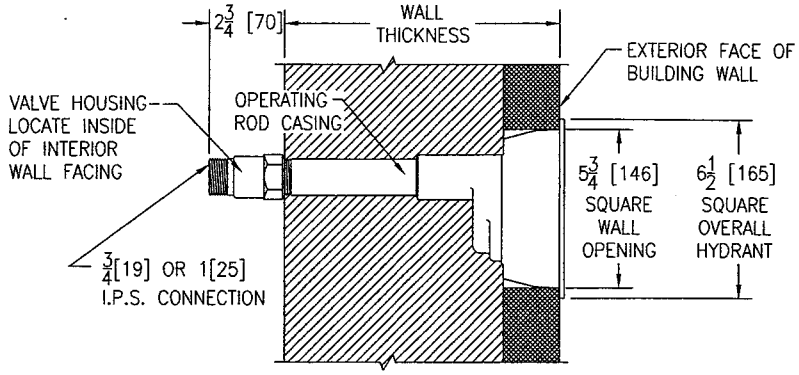
TYPICAL INSTALLATIONS



Features of a Z-1321 Exposed Ecolotrol Wall Hydrant

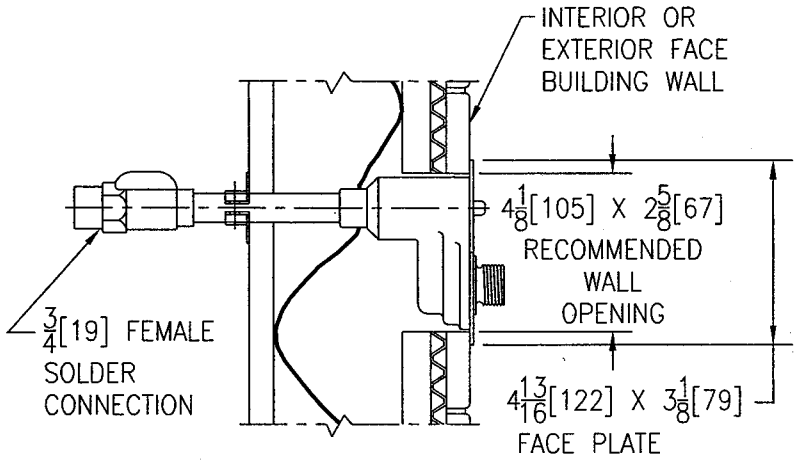
ECOLOTROL WALL HYDRANT
Encased, Non-Freeze
Z-1300

Zurn Z-1300 Ecolotrol wall hydrants provide a flush, fully enclosed, fully protected installation in any type wall construction. Hinged box cover can be locked to prevent vandalism. The same key that unlocks cover operates hydrant. Amply wide flange of box extends over wall opening and provides neat, flush installation for modern building facades.



ECOLOTROL WALL HYDRANT
Exposed, Non-Freeze, Automatic Draining, Anti-Siphon
Z-1321

Use Z-1321 hydrant where the added security of a box hydrant is not required. Optional wall clamp shown to anchor hydrant in wall. Stainless steel face provides for flush installation and years of non-corroded appearance.



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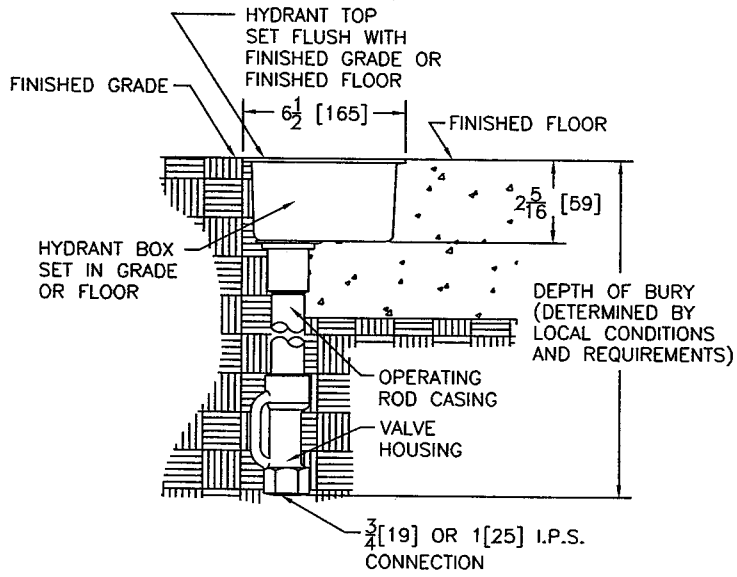
TYPICAL INSTALLATIONS

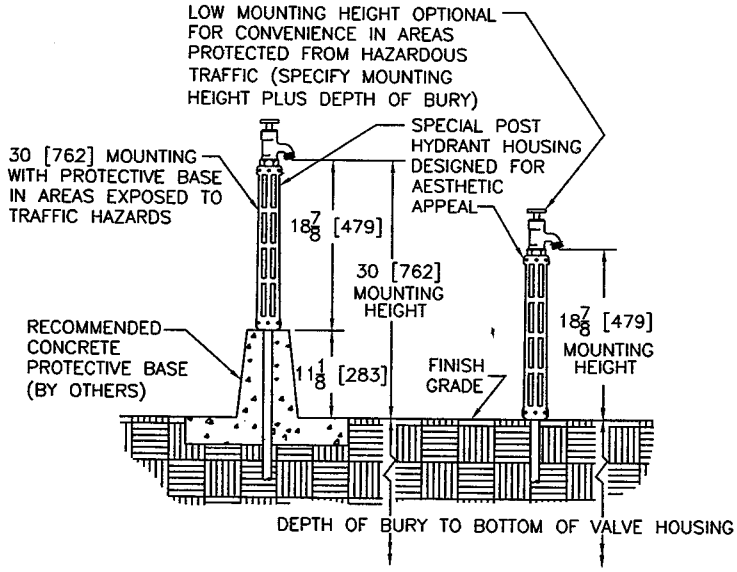
ENCASED GROUND HYDRANT
Non-Freeze, Flush with Surface
Z-1360

Zurn Z-1360 box hydrants provide free flowing water supply at any temperature in any type of commercial, recreational, industrial, or residential installation. Removable key opens surface level cover and also operates hydrant. Non-freezing, vandal proof design assures year-round convenience. Also designed with siphon-resistant drain port that is tapped 1/4" IP for drain piping connection by others.



POST HYDRANT
Non-Freeze, Exposed
Z-1385

Zurn Z-1385 post hydrants feature a unique housing designed for aesthetic appeal. Siphon resistant drain port prevents sub-surface water contamination from entering hydrant. Upward movement of the washer guide when the hydrant is turned on, positions "O" rings to seal off drain port. When hydrant is turned off, the washer guide moves down, clearing drain port to permit complete drainage of water from the hydrant. Drain port is tapped 1/4" IP for drain piping connection by others.



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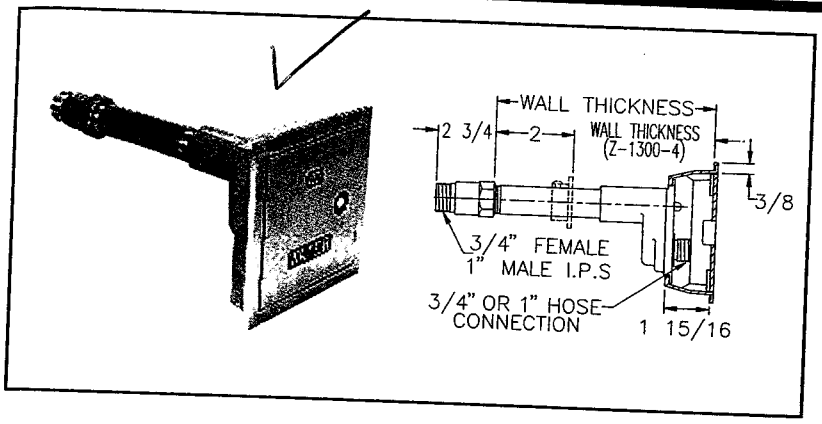
Z-1300 ECOLOTROL WALL HYDRANT – Encased, Non-Freeze, Anti-Siphon, Automatic Draining



Wall Thickness Inches	Approx. Wt. Lbs.	Nickel Bronze Box & Cover w/ Polished Face & Bronze Casing*	
		3/4" Hose Conn.	1" Hose Conn.
6 - 8	9	$698.75	$752.00
10 - 12 - 14	12	720.75	775.25
16 - 18	15	755.25	808.50
20 - 22 - 24	18	781.75	835.00

OPTIONS

SUFFIXES		ADD
-RK	Hydrant Parts Repair Kit	$ 83.25
-3	3/4" Solder Female Inlet Adapter	N/C
-4	Wall Clamp	N/C
-11	Statuary Bronze Face (Specify light, medium or dark finish.)	299.50
-12	Cylinder Lock	46.25
-13	3/4" IP 90° Inlet Elbow with Union Nut	11.75
-15	Stainless Steel Box and Cover	N/C

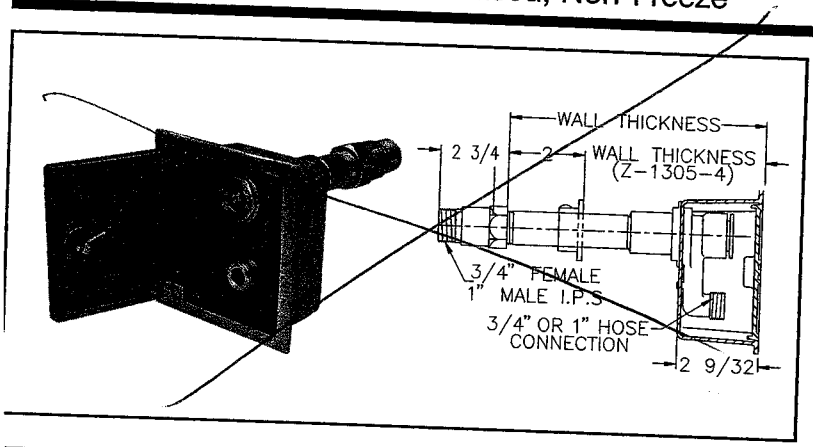
		DEDUCT
-6	Less Polished Bronze Box	$42.50

ENGINEERING SPECIFICATION

ZURN Z-1300 Encased Ecolotrol "anti-siphon" automatic draining wall hydrant for flush installation. Complete with non-freeze type integral backflow preventer, bronze casing, all bronze interior parts, non-turning operating rod with free-floating compression closure valve, replaceable bronze seat and seat washer, and combination 3/4" female or 1" male straight IP inlet. Nickel bronze box and hinged cover with operating key lock and "WATER" cast on cover.

ASSE

Z-1305 WALL HYDRANT – Encased, Non-Freeze



Wall Thickness Inches	Approx. Wt. Lbs.	Nickel Bronze Box & Cover w/ Polished Face & Bronze Casing*	
		3/4" Hose Conn.	1" Hose Conn.
6 - 8	11	$475.75	$529.25
10 - 12 - 14	13	499.00	552.25
16 - 18	15	534.00	587.25
20 - 22 - 24	17	559.50	614.00

OPTIONS

SUFFIXES		ADD
-RK	Hydrant Parts Repair Kit	$ 83.25
-3	3/4" Solder Female Inlet Adapter	N/C
-4	Wall Clamp	N/C
-11	Statuary Bronze Face (Specify light, medium or dark finish.)	299.50
-12	Cylinder Lock	46.25
-13	3/4" IP 90° Inlet Elbow with Union Nut	11.75

		DEDUCT
-6	Less Polished Bronze Box	$53.50

ENGINEERING SPECIFICATION

ZURN Z-1305 Encased, non-freeze, flush wall hydrant, with bronze casing, all bronze interior parts, non-turning operating rod with free-floating compression closure valve, replaceable bronze seat and seat washer, and combination 3/4" female or 1" male straight IP inlet. Nickel bronze box and hinged cover with operating key lock and "WATER" cast on cover.

egularly furnished unless otherwise specified.